WHAT IS CLAIMED IS:

1. An optical detection system for analyzing predetermined characteristics of a flow stream, the flow stream having a central axis along the direction of flow, the optical detection system comprising:

one or more spaced light sources positioned on a first side of the flow stream for providing light through the flow stream;

lens means positioned on the first side of the flow stream for focusing the light from each of the one or more light sources to a common focal point or region located on a second opposite side of the flow stream;

light receiving means for receiving the light from the one or more light sources, and for providing at least one signal in response thereto, at least a portion of the light receiving means located at or near the common focal point or region of the lens means; and

processing means for receiving the at least one signal from the light receiving means and for using the at least one signal for analyzing the

predetermined characteristics of the flow stream.

2. A method for analyzing predetermined characteristics of a flow stream, the flow stream having a central axis along the direction of flow, the method comprising:

providing light from a first side of the flow stream;

focusing the light to a common focal point or region located on a second opposite side of the flow stream;

receiving the light at or near the common focal point or region; and

determining the predetermined characteristics of the flow stream by analyzing the light that is received at or near the common focal point or region.

3. A method according to claim 2, wherein the light is received at the common focal point or region.

4. A method according to claim 2, wherein the light is received along an annulus that surrounds the common focal point or region.

5. A method according to claim 2, wherein the light is received along two or more annuli that surround the common focal point or region.

6. A method for determining the scattering produced by one or more particles in a stream in a flow channel, the method comprising:

activating a linear array of light sources to provide a substantially constant light intensity across a width of the flow channel; and

receiving with a light detector the substantially constant light intensity provided across the width of the flow channel by the linear array of light sources.

7. The method of claim 6, wherein the linear array of light sources is non-parallel to the flow channel.

8. The method of claim 6, further comprising analyzing a scatter pattern produced by the one or more particles in a stream in the flow channel as detected by the light

detector.

9. The method of claim 8, further comprising:

activating a second linear array of light sources to provide a second substantially constant light intensity across the width of the flow channel; and

receiving with a second light detector the second substantially constant light intensity provided across the width of the flow channel by the second linear array of light sources.

10. The method of claim 9, wherein the second linear array of light sources is non-parallel to the flow channel.

11. The method of claim 9, further comprising determining a velocity of one or more particles in the stream in the flow channel from the light detectors.

12. An apparatus for analyzing one or more particles in a stream in a flow channel, the apparatus comprising:

a linear array of light sources for providing a substantially constant light intensity across a width of the flow channel; and

a light detector for receiving the substantially constant light intensity across the width of the flow channel from the linear array of light sources.

13. The apparatus of claim 12, wherein the linear array of light sources is non-parallel to the flow channel.

14. The apparatus of claim 12, further comprising a processor, connected to the light detector, for analyzing a scatter pattern produced by one or more particles in a stream in the flow channel as detected by the light detector.

15. The apparatus of claim 14, further comprising:

a second linear array of light sources for providing a second substantially constant light intensity

across the width of the flow channel; and

a second light detector for receiving the substantially constant light intensity across the width of the flow channel from the second linear array of light sources.

16. The apparatus of claim 15, wherein the second linear array of light sources is non-parallel to the flow channel.

17. The apparatus of claim 15, wherein the processor is connected to the second light detector for determining a velocity of one or more particles in the stream in the flow channel.